BROOKHAVEN NATIONAL LABORATORY

RHIC PROJECT

RADIATION SAFETY COMMITTEE

RHIC SUB - COMMITTEE

To: R.K. Reece

From: A. Etkin

Date: July 28, 1995

Subject: Review of STAR Shield Wall and Accesses July 21, 1995

On Friday July 21, 1995 the RHIC Sub-Committee of the RHIC-AGS Radiation Safety Committee met to review the proposed shield wall and the personnel access labyrinths into the STAR Intersection Building. In attendance were D. R. Beavis, R. Brown, W. Christie, D. Dayton, A. Etkin, R. Frankel, B. Miller and A. Stevens.

The Shield wall closes the 27 ft. square access for transferring the STAR detector between the Interaction Hall and the Assembly Building [for details see 1 and 2]. The shielding for this access consists of a removable shield wall in front of a shielded alcove into the Intersection Hall. There are 3 layers of light concrete shield blocks, a bottom layer 6 ft. thick and 10 ft. high, a middle layer 5 ft. thick and 10 ft. high and a top layer 4 ft. thick an 8 ft. high. Individual blocks are cast so that the vertical edges of adjacent blocks overlap. Horizontal gaps are closed by steel inserts that fit in recesses in the tops and bottoms of the blocks. The alcove has 3 ft. walls and a 2 ft. roof and will be cast in place from light concrete. The two labyrinths are located on each side of the shield wall and do not have to be disassembled to permit the detector to be moved. One is 4 legged and the other is 3 legged and they have 2 ft. roofs.

There is a two legged cable access labyrinth between the Intersection Hall and the service building that is shielded by the western access labyrinth. The top of the cable labyrinth is flush with the top of the roof of the personnel access. STAR requires that a 1 ft. deep by 3 ft. wide slot be made in the roof to bring cables from the service building to the detector. This slot is shielded by shielding blocks on the roof. In addition there are six 1 ft. diameter cable penetrations in the wall into the assembly building. They are in two rows located 23 ft. and 25 ft. above the floor partially shielded by the block wall. These holes will be filled with cables, gas lines and cooling water lines and will have open spaces plugged. A 1 ft. square slot is cut in edge of the shielded alcove wall behind the shield block wall for the umbilical from the detector in the assembly hall to the DAQ area. This slot will be filled with optical fibers, cables and packing.

A summery of the results of review of the major radiation issues follows. Calculations of the dose just outside the shield block wall from a design fault show that the bottom and middle layers are in compliance with requirements for four time design intensity [see 3] [design intensity fault dose is 60 mrem for the bottom and 110 mrem for the middle]. The top row is in compliance with requirements for design intensity but not for four time design intensity [see 3,4] [design intensity fault dose is 200 mrem] and this situation will be reevaluated at a future date. The labyrinths provide sufficient attenuation [see 5][greater than 1000 to 1 versus the required 20 to 1]. The proposed 2 ft. roof thickness is considered satisfactory [see 6]. A calculation of the sufficiency of the shielding by the existing wall between the interaction region and the assembly building gives a four times design intensity fault dose of 380 mrem. In their proposed location the cable penetrations will produce a dose of 200 mrem for a four times design intensity fault in an area that should not be occupied [see 8 and 9]. Based on this discussion it is recommended that the present conceptual design be approved for detailed design, that the final design be submitted for review by the sub-committee **[Action item STAR-1; R. Brown]** and that the as built shielding be reviewed before operation **[Check list STAR-1]**.

The report of the external review committee for the Personnel Safety System along with the response was discussed and it was decided to distribute the two documents to the sub-committee for study before making a recommendation.

A proposal was made that the requirements for the ATR and G-2 Personnel Protection System be modified to permit areas that have not been opened to remain swept and reset even if they have been put in the restricted access state. The concern of whether this difference from the AGS system would lead to confusion on the part of the operators was raised and it was decided to consult with P. F. Ingrassia.

xc: [without attachments except as noted] L. A. Ahrens, D. R. Beavis, H. N. Brown, R. Brown, G. M. Bunce, I. H. Chiang, W. Christie, R. C. Connolly, D. Dayton, R. Frankel, J. W. Glenn, M. A. Harrison, M.V. Heimerle [with att.], P. F. Ingrassia, D. M. Lazarus, E. T. Lessard, T. W. Ludlam, W. MacKay, J. Marx, A. J. McGeary, B. Miller, R. P. Miltenberger, S. V. Musolino [with att.], S. Ozaki, J. W. Spinner, M. O'Brien [with att.], A. J. Stevens and D. Trbojevic

attachments:

1] STAR Shielding Proposal - Layout Drawing

2] Drawing by D. Dayton - "Shielding at the Wide Angle Hall" - July 20, 1995

3] Memo from S. Musolino to W. Christie - "Proposed Design of STAR Shield Wall" - February 24, 1995

4] Memo from A. J. Stevens to S. Musolino - "Summary of STAR Shielding Enclosure Meeting on 04/13/95" - April 14, 1995

5] Memo from A. J. Stevens to A. Etkin and S. Musolino - "Labyrinths in Proposed STAR Shielding Enclosure" - April 17, 1995

6] Memo from A. J. Stevens to A. Etkin and S. Musolino - "Roof Thicknesses in the STAR Enclosure" April 19, 1995

7] Memo from A. J. Stevens to W. Christie and S. Musolino - "Verification of Sufficiency of Backwall Thickness at 6 O'clock" - May 2, 1995

8] Memo from A. J. Stevens to A. Etkin and S. Musolino - "Cable Penetrations in the 6 O'clock Backwall" June 6, 1995

9] Memo from W. Edwards to T. Ludlam and T. Nehring - "Crane Access Ladder and Assembly Building Coordination" - June 27,1995

10]"Committee Report on the RHIC Personnel Safety System at Brookhaven National Laboratory" - June 2, 1995

11]Memo from R. Frankel to A. Etkin - "Recommended Actions to the Committee Report on the RHIC Personnel Safety System at Brookhaven National Laboratory" - July 21, 1995

Action Item - 1

Check List - 1